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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/548,946	04/13/2000	Maria Cristina B. Estacio	18865-004500US	6946

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TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

PAREKH, NITIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/548,946

Applicant(s)

ESTACIO ET AL.

Examiner

Nitin Parekh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2000 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 5, 6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US Pat. 6307755) in view of Temple et al (US Pat. 5103290).

Regarding claim 5, Williams et al. disclose a leadframe/MOSFET chip device comprising:

- a lead frame having three terminals/source-gate-drain terminals/connections having source/gate section/rail and drain section/rail (502 and 500 respectively in Fig. 20A; Col. 19, line 63- Col. 20, line 5), the package comprising wireless connections
- a die (510 in Fig. 20A) having source/gate connections/terminals on a top side (not numerically referenced in Fig. 20A) corresponding to those on the lead frame (Col. 20, lines 1-5) being bonded to the respective lead frame section/rail (502 in Fig. 20A) to provide electrical connections between the top side of the die and the respective lead frame section/rail, and

- the lead section/rail having the drain connection (500 in Fig. 20A) being bonded to the backside of the die to provide electrical connections to the respective drain connection

(Fig. 20A; Col. 19, line 40- Col. 20, line 5).

Williams et al. fail to:

- a) explicitly show in Fig. 20A, the die being bumped and having solder bumps, and
- b) teach a copper clip being on the backside of the die such that the copper clip strap couples the drain regions of the bumped die and the lead rail.

a) Williams et al. further teach prior art and another embodiments comprising the dice having conventional flip chip die attachment comprising bumps (Col. 12, lines 25-30) including the embodiment (see Fig. 16C) comprising a die having bumps on a top side of the die (see 342 in Fig. 16C; Col. 17, line 10).

Temple et al. teach using a die having solder bump connections (30/44 in Fig. 2-7; Col. 5, line 38- Col. 7, line 3).

b) Williams et al. teach the prior art configuration (Fig. 19F-H) where a copper strap/clip having a V-shape/U-shape bend/groove (see 460 in Fig. 19H) is attached to a second/back side of a die (462 in Fig. 19H) using an epoxy (Col. 18, line

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66) such that the strap/clip couples the respective connection region of the die and a section/rail of the lead frame (see 461/470 in Fig. 19H; Col. 18, lines 56-65). Williams et al. further teach using conventional attach material including the conductive epoxy or solder/solder paste to provide the desired connections (Col. 15, line 50).

It would have been obvious to a person of ordinary skill the art at the time invention was made to incorporate a the die being bumped and having solder bump connections and the copper clip being attached on the backside of the die connecting the drain regions and lead rail as taught by the embodiments in Williams et al. and Temple et al. so that mechanical stress can be reduced and electrical performance, bonding strength and an alignment of the leads/die can be improved in Williams et al's device.

Regarding claim 6, Williams et al. and Temple et al. teach substantially the entire claimed structure as applied to claim 5 above, wherein Williams et al. further teach using the solder paste to provide the attachment of the die (Col. 15, line 50).

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Regarding claim 8, Williams et al. and Temple et al. teach substantially the entire claimed structure as applied to claim 5 above, wherein Williams et al. further teach the bumps having an under bump material/UBM (see 202/203 in Fig. 13A; Col. 12, lines 37-48).

Regarding claim 9, Williams et al. and Temple et al. teach substantially the entire claimed structure as applied to claim 5 above, wherein Williams et al. further teach lead frame including sections/rails comprising conventional material such as copper (Col. 1, line 56; Col. 12, line 53).

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US Pat. 6307755) and Temple et al. ((US Pat. 5103290) as applied to claim 5 above, and further in view of Kalfus et al. (US Pat. 4935803).

Regarding claim 7, Williams et al. and Temple et al. teach substantially the entire claimed structure as applied to claim 5 above, except the lead rail having a V-groove.

Kalfus et al. teach a lead frame assembly (Fig. 5) having a clip/strap including a variety of configurations/shapes of an attachment of clip/strap and the leadframe including the configuration where the lead section/rail has a V-groove (see 50 in Fig. 5)

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being bonded to respective groove of the clip/strap (60 in Fig. 5) providing an improved bonding and alignment (Col. 4, line 37- Col. 6, line 35).

It would have been obvious to a person of ordinary skill the art at the time invention was made to incorporate the lead rail having a V-groove as taught by Kalfus et al. so that mechanical stress can be reduced and the alignment and bonding strength can be improved in Temple et al. and Williams et al's device.

Response to Arguments

4. Applicant's arguments with respect to claims 5 and 6 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.



Nitin Parekh

PATENT EXAMINER

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NP

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